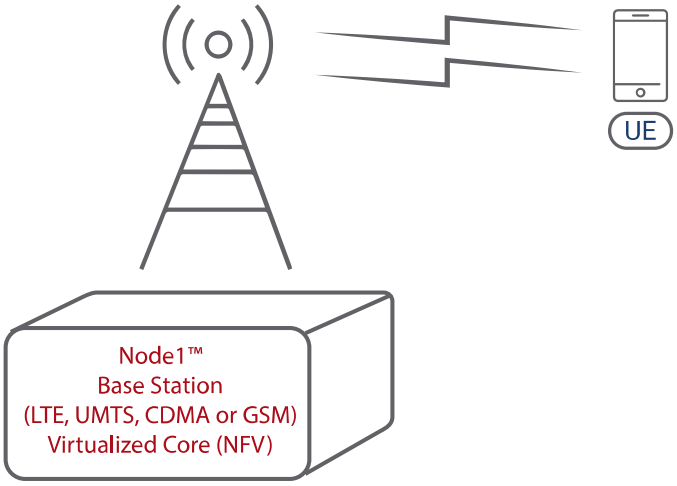
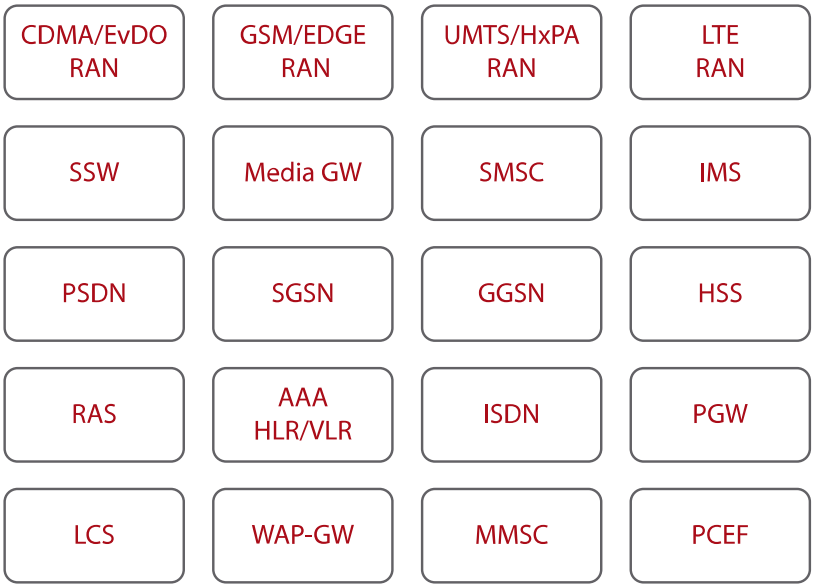
Lemko's Fundamental Architecture



Node1™ Major NFV Components

Node 1™



LEMKO 4G (LTE) Node1™

Evolved Packet Core (EPC) plus eNodeB (eNB)

EPC

LEMKO Node1™ LTE is a complete solution (EPC plus eNB) for managing broadband connectivity for mobile subscriber data services. LEMKO EPC is software defined, virtualized solution based on commercial off the shelf components. All LEMKO solutions are based on flat network architecture and because they are virtualized, they are software upgradable. LEMKO EPC provides network operators with a robust and feature-rich platform that scales with the growth of the operator.

Functional Node1™ LTE elements include:

Patent Owner, Lemko Corp. - Ex. 2011, p. 2

HSS/CDR/PPD/AUR/EIR

MGW

MME

SGW

PGW

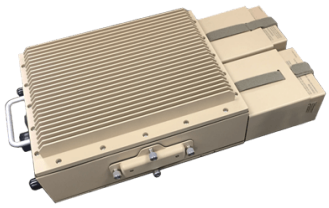
PCRF

Node1™ LTE incorporates advanced Operations, Administration & Maintenance architecture that provides cloud based suite of network management tools and controls.

eNodeB

LEMKO LTE eNodeBs provide network design flexibility and packaging that delivers world-class performance meeting wide range of broadband operators' requirements. LEMKO's scalable LTE solutions enable customers to create networks to meet the growing demand for mobile broadband. LEMKO eNodeB portfolio provides the industry's most extensive range of solutions defined by capacity, scale and proven reliability. LEMKO LTE offering includes macro, mini and pico eNBs. LEMKO offers high-quality, carrier grade eNB products in multiple frequency bands and suitable for outdoor or indoor use.

Man-Portable X-4 Node1™



X-5 LTE Mini

Macro LTE Node1™ 4G

EZ LTE 3.65 GHz Node1™

LEMKO 3G (UMTS) Node1™

Patent Owner, Lemko Corp. - Ex. 2011, p. 3

MSC plus WCDMA Radio Access Network (NodeB)

MSC

LEMKO Node1™ UMTS is a complete scalable network solution (MSC plus NodeB) for managing voice, SMS and high speed data services for mobile subscriber. LEMKO UMTS IP MSC is an all IP voice and data switching/routing system. Node1™ UMTS provides network operators with a robust and feature-rich platform that scales with the growth of the RAN network.

Functional Node1™ UMTS elements include:

HLR/VLR/CDR/PPD/AUR/EIR

MGW

SMSC/MMSC

SGSN

GGSN

MSC

NodeB

Node1™ UMTS incorporates advanced Operations, Administration & Maintenance architecture that provides cloud based suite of network management tools and controls.LEMKO's UMTS NodeB portfolio provides performance, capacity, power consumption and proven reliability supporting network operators voice and data requirements. LEMKO WCDMA offering includes High Speed Packet Access (HSPA), designed to improve the performance of 3G mobile telecommunication networks utilizing the WCDMA protocols. LEMKO solution delivers high-quality voice and mobile broadband at multiple frequency bands. LEMKO's UMTS NodeB delivers world class performance meeting wide range of network provider requirements for any size deployment. LEMKO's UMTS NodeB portfolio provides performance, capacity, power consumption and proven

Patent Owner, Lemko Corp. - Ex. 2011, p. 4

reliability supporting network operators voice and data requirements. LEMKO solution delivers high-quality voice and mobile broadband at multiple frequency bands. LEMKO's UMTS NodeB delivers world class performance meeting wide range of network provider requirements for any size deployment.

LEMKO 2G (GSM) Node1™

GSM IP MSC plus GSM Radio Access Network (BTS)

MSC

LEMKO Node1™ GSM is a complete scalable network solution (MSC plus BTS) for managing voice and data services for mobile subscriber. LEMKO GSM IP MSC is an all IP voice and data switching/routing system. Node1™ GSM provides network operators with a robust and feature-rich platform that scales with the growth of the RAN network.

Functional Node1™ GSM elements include:

HLR/VLR/CDR/PPD/AUR/EIR/AuC

MGW

SMSC/MMSC

SGSN

GGSN

MSC

Node1™ GSM incorporates advanced Operations, Administration & Maintenance architecture that provides cloud based suite of network management tools and controls.

BTS

LEMKO's GSM BTS portfolio provides performance, capacity, power consumption and proven reliability supporting network operators voice and data requirements. LEMKO GSM

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offering includes Enhanced Data rates for GSM Evolution (EDGE), designed to deliver high-quality voice and packet data at multiple frequency bands. LEMKO's GSM BTS delivers world class performance meeting wide range of network provider requirements for any size deployment.

LEMKO 3G (CDMA/EvD0) Node1™

CDMA IP MSC plus CDMA Radio Access Network (BTS)

MSC

LEMKO Node1 ™ CDMA is a complete scalable network solution (MSC plus BTS) for managing voice and data services for mobile subscriber. LEMKO CDMA IP MSC is an all IP voice and data switching/routing system. Node1™ CDMA provides network operators with a robust and feature-rich platform that scales with the growth of the RAN network.

Functiona Node1™ CDMA elements include:

HLR/VLR/CDR/PPD/AUR/EIR/AuC

MGW

SMSC/MMSC

PDSN

MSC

Node1™ CDMA incorporates advanced Operations, Administration & Maintenance architecture that provides cloud based suite of network management tools and controls.

BTS

LEMKO's CDMA BTS portfolio provides performance, capacity, power consumption and proven reliability supporting network operators voice and data requirements.

Patent Owner, Lemko Corp. - Ex. 2011, p. 6

LEMKO CDMA RAN portfolio provides performance, capacity and proven reliability supporting network operators voice and data requirements. LEMKO CDMA RAN offering includes CDMA2000 1X, designed to deliver high-quality voice and packet data, and EV-DO mobile broadband technology at multiple frequency bands. LEMKO's CDMA BTS delivers world class performance meeting wide range of network provider requirements for any size deployment.

Universal Signaling Gateway – Node2™

The LEMKO Node2™ system is a compact packaging of the primary signaling gateway components of a cellular system. While the LEMKO Node1™ provides a flexible and expandable cellular system that can operate as a standalone cellular network or as an integral adjunct element to a larger cellular network, the LEMKO Node2™ provides an integrated SS7 or SigTRAN interface for the cellular network. The Node2™ architecture leverages traditional (CDMA, GSM, UMTS) as well as IP based (LTE) networks to provide a system architecture that efficiently integrates current and emerging technologies. The Node2™ provides access to the public network for cellular roaming support, call originations and terminations.

The LEMKO Node2™ can support all standard interfaces to the signaling network including:

MAP

Diameter

IS-41

SMPP

SMTP/MM4

CAMEL

ISUP

Patent Owner, Lemko Corp. - Ex. 2011, p. 7

Node2™ Major Functionality Components

Node2™ (gateway)

- SS7GW
- ISUP GW
- CVGG
- AC
- Voice Mail
- GGSN
- MAP/SigTRAN Diameter

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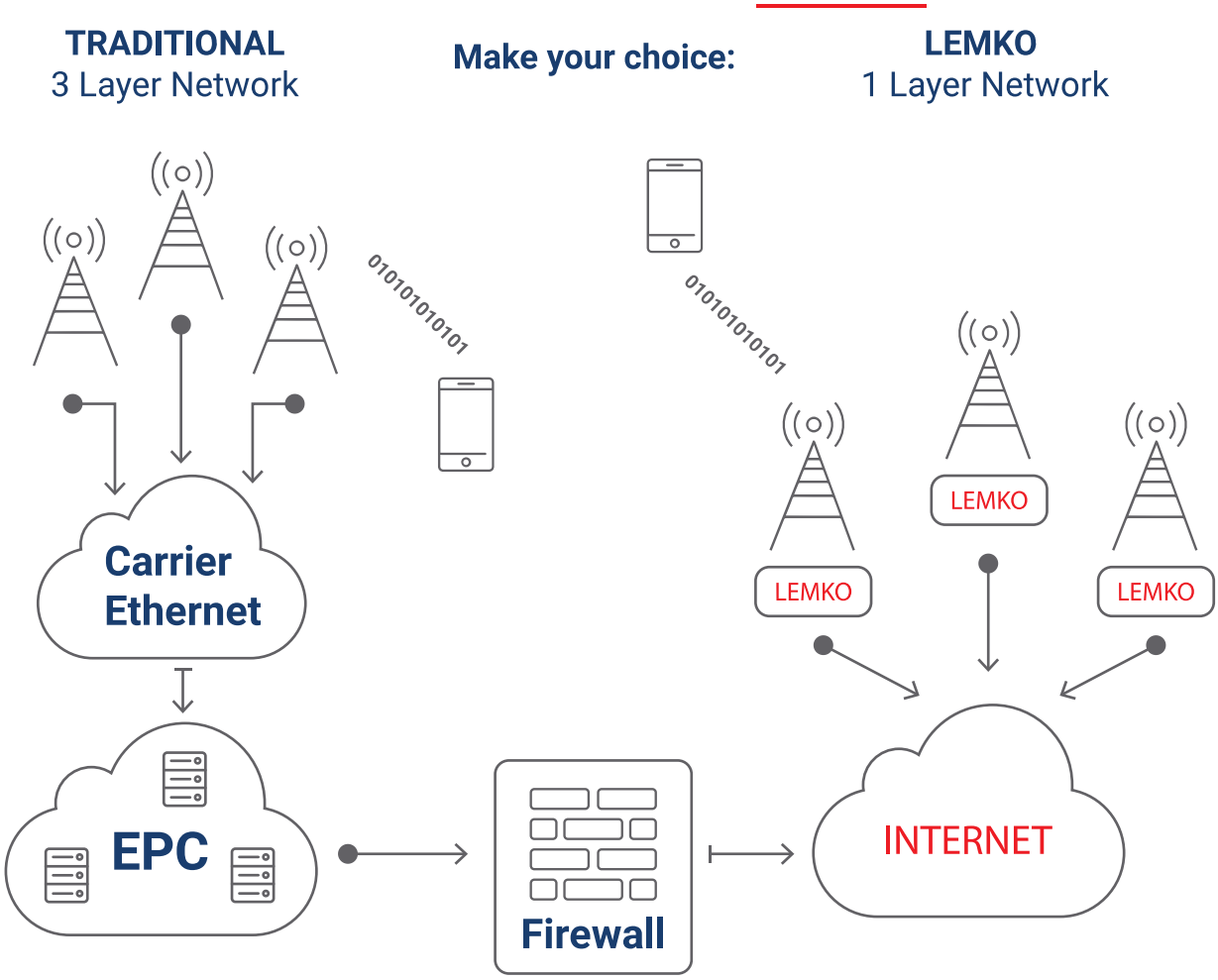

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